

Substitute paragraph 59 with the following paragraph:

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FIG. 6 illustrates the steps of a method for printed bandpass filter design 600. In step 610, the variable filter design parameters used in the design are selected. In step 620, printed bandpass filter performance is simulated. In step 640, if simulated printed bandpass filter performance is equal to the filter design goal performance, step 630 is performed. If printed bandpass filter simulated performance is different from filter design goal performance, step 650 is performed. In step 630, the filter design is complete. In step 650, the filter design parameters are incrementally varied in a manner to cause the simulated printed filter performance to approach the design goal performance. Steps 620, 630, and 650 are repeated until the simulated filter performance is equal to the design goal performance.

In the Claims:

Please cancel claims 13-14.

Please substitute the following claims for the pending claims:

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1. (Once Amended) A bandpass filter, comprising:

a plurality of spiral resonators that are electromagnetically coupled to each other, each spiral resonator having a terminal coupled to a ground;

a bypass line in parallel with said plurality of spiral resonators, said bypass line having a bypass line input coupled to a first spiral resonator of said plurality of resonators and a bypass line output coupled to a second spiral resonator of said plurality of resonators;

an input, coupled to said first spiral resonator; and

an output, coupled to said second spiral resonator;

said bypass line input formed from an outer segment of said first spiral resonator that is in-parallel with a first portion of said bypass line, said bypass line output formed from an outer segment of said second spiral resonator that is arranged in-parallel with a second portion of said bypass line.

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2. (Once Amended) The bandpass filter of claim 1, wherein said spiral resonators are quarter wavelength transmission lines.

3. (Once Amended) The bandpass filter of claim 2, wherein said quarter wavelength transmission lines are microstrip transmission lines.

4. (Once Amended) The bandpass filter of claim 1, further comprising:
an input capacitor coupled between said input and said first spiral resonator; and
an output capacitor coupled between said output and said second spiral resonator.

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6. (Once Amended) The bandpass filter of claim 4, further comprising:
a bypass line input coupler, coupled between said bypass line and said first spiral resonator; and
a bypass line output coupler, coupled between said bypass line and said second spiral resonator.

7. (Once Amended) The bandpass filter of claim 6, wherein said plurality of spiral resonators includes a third spiral resonator coupled between said first spiral resonator and said second spiral resonator.

8. (Once Amended) The bandpass filter of claim 7, further comprising:
a substrate, wherein said plurality of spiral resonators, said bypass line, said input capacitor, said output capacitor, said bypass line input coupler, and said bypass line output coupler are printed on said substrate.

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10. (Once Amended) A bandpass filter comprising:
an input coupled to an input capacitor;
an output coupled to an output capacitor;
a first spiral resonator coupled to a ground, said input capacitor, a first intercoupler and a bypass line input coupler;

a second spiral resonator coupled to said ground, a second intercoupler, a bypass line output coupler, and said output capacitor;

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a third spiral resonator coupled to said ground, said first intercoupler, and said second intercoupler, wherein said first spiral resonator, said second spiral resonator and said third spiral resonator are electromagnetically coupled quarter wavelength transmission lines;

a bypass line coupled between said bypass line input coupler and said bypass line output coupler, wherein said bypass line causes improved image channel signal rejection at said output; and

a substrate, wherein said first spiral resonator, said second spiral resonator, said third spiral resonator, said bypass line, said input capacitor, said output capacitor, said bypass line input coupler, and said bypass line output coupler are printed on said substrate;

said bypass line input coupler formed from an outer segment of said first spiral resonator that is in-parallel with a first portion of said bypass line, said bypass line output coupler formed from an outer segment of said second spiral resonator that is arranged in-parallel with a second portion of said bypass line.

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12. (Once Amended) A differential bandpass filter, comprising:

a plurality of spiral resonators that are electromagnetically coupled to each other, each spiral resonator having a terminal coupled to a ground;

a first bypass line, in parallel with said plurality of spiral resonators, said bypass line having a bypass line input coupled to a first spiral resonator and a bypass line output coupled to a second spiral resonator;

a first input, coupled to said first spiral resonator;

a first output, coupled to said second spiral resonator;

a second plurality of spiral resonators that are electromagnetically coupled to each other, each spiral resonator having a terminal coupled to said ground;

a second bypass line, in parallel with said second plurality of spiral resonators, said second bypass line having a second bypass line input coupled to a third spiral resonator and a second bypass line output coupled to a fourth spiral resonator;

a second input, coupled to said third spiral resonator; and

a second output coupled to said fourth spiral resonator;

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said first bypass line input formed from an outer segment of said first spiral resonator that is in-parallel with a first portion of said bypass line, said bypass line output formed from an outer segment of said second spiral resonator that is arranged in-parallel with a second portion of said bypass line;

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said second bypass line input formed from an outer segment of said first spiral resonator that is in-parallel with a first portion of said bypass line, said bypass line output formed from an outer segment of said ^{fourth} second spiral resonator that is arranged in-parallel with a second portion of said bypass line; and

said first input and said second input forming a differential input capable of receiving a differential signal, said first output and said second output forming a differential output capable of producing a differential signal.

15. (Once Amended) A double conversion tuner, comprising:

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a tuner input;

a first variable gain amplifier, coupled to said tuner input;

a first mixer coupled to a first local oscillator and said first variable gain amplifier;

a printed bandpass filter, coupled between said first mixer and a second mixer, including

a plurality of spiral resonators that are electromagnetically coupled to each other, each spiral resonator having a terminal coupled to a ground;

a bypass line, in parallel with said plurality of spiral resonators, said bypass line having a bypass line input coupled to a first spiral resonator and a bypass line output coupled to a second spiral resonator;

said bypass line input formed from an outer segment of said first spiral resonator that is in-parallel with a first portion of said bypass line, said bypass line output formed from an outer segment of said second spiral resonator that is arranged in-parallel with a second portion of said bypass line;

a bandpass filter input, coupled to an output of said first mixer; and
a bandpass filter output coupled to an input of said second mixer;

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a second local oscillator, coupled to said second mixer;
a second IF bandpass filter coupled to said second mixer and a second
variable gain amplifier; and
a tuner output, coupled to said second variable gain amplifier.

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17. (Once Amended) The bandpass filter of claim 7, further comprising:

a first intercoupler that weakly couples said first spiral resonator to said third spiral resonator; and

a second intercoupler that weakly couples said third spiral resonator to said second spiral resonator.
